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SEQUENCE LISTING

<110> ANGES MG, INC.

<120> NOVEL ACTIN-RELATED CYTOSKELETAL PROTEIN "LACS"

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<151> 2002-08-30

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Leu Ala Lys Met Lys Arg Gln Phe Glu Lys Asp Glu Met Thr Ser Thr

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Cys Asn Ala Phe Ser Glu Tyr Gln Tyr Gln His Glu Ser Arg Ser Glu

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Gln Glu Ala Ile His Asn Arg Gln Glu Ile Arg Arg Asn Glu Glu Glu

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Val Ser Lys Gly His Arg Thr Asp Val Phe Lys Ala Glu Met Met Ser

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His Leu Glu Lys His Thr Glu Glu Thr Asn Gln Ala Ser Gln Phe Arg

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Gln Tyr Val Gln Glu Thr Val Ile Asp Thr Pro Glu Asp Glu Glu Ile

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Pro Lys Val Ser Thr Lys Ile Leu Lys Glu Gln Phe Glu Lys Thr Ala

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Gln Glu Asn Phe Leu Tyr Ser Asp Lys Glu Thr Thr Thr Pro Ala Lys

3 / 3 3

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Cys Ile Lys Ile Glu Asn Asp Ser Glu Glu Thr Leu Lys Pro Ser Ser

165 170 175

Ala Met Gly Thr Ser Ser Tyr Thr Ser Ala Arg Gln Ser Lys Glu Thr

180 185 190

Ser Thr Ser Ser Tyr Ser Asn His Ser Leu Thr Ser Thr Ile Leu Ala

195 200 205

Gln Glu Lys Gly Thr Pro Ser Gly Lys Met Glu Glu Phe Pro Pro Pro

210 215 220

Pro Pro Asp Val Phe Gln Thr Pro Met Asp Val Thr Ala Phe Ser Gln

225 230 235 240

Ser Pro Glu Phe Pro Ser Pro Pro Arg Arg Leu Pro Met Pro Arg Asp

245 250 255

Val Tyr Ser Lys Gln Arg Asn Leu Tyr Glu Leu Asn Arg Leu Tyr Arg

260 265 270

His Ile His Pro Glu Leu Arg Lys Asn Leu Glu Lys Asp Tyr Ile Ser

275 280 285

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Glu Val Ser Glu Ile Val Ser Ser His Ile Asn Ser Gly Asn Ser Ile

290

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Ser Ala Gly Val Gln Gln Ala Arg Tyr Val Phe Glu Asn Thr Asn Asp

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Ser Ser Gln Lys Asp Leu Ser Ser Glu Arg Glu Asn Leu Glu Trp Asp

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Glu Ile Leu Lys Gly Glu Val Gln Ser Ile Arg Trp Ile Phe Glu Asn

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Gln Pro Leu Asp Ser Ile Asn Gln Gly Phe Thr Asp Glu Ala Tyr Thr

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Ser Lys Gly Ile Ala Asp Gln Glu Leu Ile Ala Gly Gly Asp Val Lys

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375

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Tyr Thr Thr Trp Met Phe Glu Thr Gln Pro Ile Asp Ala Leu Gly Val

385

390

395

400

Pro Ser Ala Gly Thr Glu Glu Asn Thr Glu Lys Ile Pro Glu Leu Ala

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410

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Lys Gly Asp Val Cys Thr Ala Arg Trp Met Phe Glu Thr Arg Pro Leu

420

425

430

5 / 3 3

Asp Ser Met Asn Lys Met His Glu Trp Glu Asp Glu Thr Ala Ser Thr

435

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445

Phe Ile Lys Asp Ile Thr Gly Gly Asp Val Lys Thr Val Arg Tyr Met

450

455

460

Phe Glu Thr Gln Gln Leu Asp Gln Leu Gly Gln Leu His Ser Val Asp

465

470

475

480

Glu Met Asn Leu Leu Gln Leu Arg Ser Glu Leu Lys Glu Ile Lys Gly

485

490

495

Asn Val Lys Arg Ser Ile Lys Cys Phe Glu Thr Gln Pro Leu Tyr Val

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Ile Arg Asp Gly Ser Gly Gln Met Leu Glu Ile Lys Thr Val Gln Arg

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Glu Asp Ile Glu Lys Gly Asp Val Arg Thr Ala Arg Trp Met Phe Glu

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535

540

Thr Gln Pro Leu Asp Thr Ile Lys Gln Asp Ile Thr Glu Ile Lys Val

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550

555

560

Val Arg Gly Ile Ser Met Glu Glu Asn Val Lys Gly Glu Val Gly Arg

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565

570

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Ala Arg Trp Leu Phe Glu Thr Gln Pro Leu Glu Lys Ile Lys Glu Glu

580

585

590

Ser Gly Glu Ala Val Leu Lys Thr Glu Ala Val Val Gly Ile Asp Val

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605

Ser Lys Lys Cys Trp Met Phe Glu Thr Gln Pro Leu Asp Thr Leu Lys

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Gln Ser Pro Asp Thr Glu Ser Val Ser Pro Glu Glu Arg Ile Gly Gly

625

630

635

640

Asp Val Lys Thr Thr Lys His Leu Leu Glu Thr Leu Pro Ile Glu Ala

645

650

655

Leu Lys Asp Ser Pro Asp Val Gly Lys Leu Gln Lys Ile Thr Ala Ser

660

665

670

Glu Glu Glu Lys Gly Asp Val Lys His Gln Lys Trp Val Phe Glu Thr

675

680

685

Gln Arg Leu Glu Asp Ile Arg Glu Asp Lys Lys Glu Tyr Thr Gln Thr

690

695

700

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Val Lys Leu Glu Ala Val Asp Arg Gly His Val Lys Asn Glu Thr His
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Ile Phe Glu Ser Asn Asn Leu Ile Lys Val Asp Ala Ser His Gln Ile
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Glu Val Glu Gly Val Thr Arg Gly Thr Val Glu Leu Asn Lys Ser Leu
740 745 750

Phe Glu Thr Thr Pro Leu Tyr Ala Ile Gln Asp His Leu Gly Lys Tyr
755 760 765

His Gln Val Lys Thr Val Gln Gln Glu Glu Ile Val Arg Gly Asp Val
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Arg Ser Cys Arg Trp Leu Phe Glu Thr Arg Pro Ile Asp Gln Phe Asp
785 790 795 800

Glu Ser Leu His Lys Phe Gln Ile Ile Arg Gly Ile Ser Ala Gln Glu
805 810 815

Ile Gln Ala Gly Asn Val Lys Ser Ala Arg Trp Leu Phe Glu Thr Gln
820 825 830

Pro Leu Asp Ser Ile Lys Tyr Phe Ser Asn Val Glu Glu Thr Asp Ser
835 840 845

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Lys Thr Glu Gln Ser Thr Asp Ile Val Lys Gly Asp Val Lys Thr Cys

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855

860

Lys Trp Leu Phe Glu Thr Gln Pro Met Glu Ser Leu Tyr Glu Lys Ala

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870

875

880

Ser Leu Met Thr Asn Ser Glu Asp Ile His Lys Gly Asp Val Arg Thr

885

890

895

Cys Met Trp Leu Phe Glu Thr Gln Pro Leu Asp Ala Ile Lys Asn Asp

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905

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Ser Glu Ala Thr Val Lys Leu Gln Thr Val Lys Gln Glu Glu Ile Gln

915

920

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Gly Gly Asp Val Arg Thr Ala Cys Leu Leu Phe Glu Thr Glu Asn Leu

930

935

940

Asp Asn Ile Gln Gly Gly Glu Gly Lys Glu Thr Lys Pro Val Glu Met

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950

955

960

Asp Ile Glu Ser Gly Asp Val Ser Gly Met Lys Tyr Lys Phe Glu Asn

965

970

975

Gln Ser Leu Asp Ser Ile Ser Cys Ser Ser Glu Asn Val Leu Asn Lys

9 / 3 3

980

985

990

Ile Lys Thr Leu Lys Ile Glu Asp Ile Gln Lys Gly Asn Val Leu Asn

995

1000

1005

Cys Arg Trp Leu Phe Glu Asn Gln Pro Ile Asp Met Ile Lys Glu Asn

1010

1015

1020

Gln Glu Gly Asp Gly Leu Val Lys Thr Val Thr Asp Ile Gln Gly Gly

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Gln Pro Leu Tyr Ala Ile Gln Asp Gln Glu Gly Phe Tyr His Glu Val

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Thr Thr Val Lys Lys Glu Glu Thr Ile His Gly Asp Val Arg Gly Thr

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10 / 33

Arg Trp Leu Phe Glu Thr Lys Pro Leu Asp Ser Ile Asn Ala Ser Glu

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Asp Val Tyr Ile Ile Lys Ser Val Thr Gln Glu Asp Ile Gln Lys Gly

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Asp Val Ser Ser Val Arg Tyr Arg Phe Glu Thr Gln Pro Leu Asp Met

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1165

Ile Ser Asp Lys Ser His Asn Ile Met Pro Thr Ile Asp His Ile Gln

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Gly Gly Asn Val Gln Met Asn Lys Gln Leu Phe Glu Ser Glu Gly Gly

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1200

Asp Lys Lys Asn Tyr Val Arg Thr Val Ser Ile Asn Glu Ile Gln Lys

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1210

1215

Gly Asn Val Lys Thr Ser Thr Trp Leu Phe Glu Thr His Ser Ile Asp

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1225

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Glu Leu Gly Glu Val Ser Thr Tyr Glu Asn Ile Lys Thr Val Thr Gln

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Glu Asp Val Gln Lys Gly Asp Val Lys Gln Ala Val Trp Leu Phe Glu

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Tyr Ser Gln Arg Val Val Glu Ala Pro Gly Ile Ile Ile Glu Ala Asp

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Glu Val Gly Asp Val Arg Met Ala Lys Tyr Lys Leu Met Asn Gln Arg

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Phe Ile Ser Glu Glu Glu Lys Gly Asn Val Asn Phe Thr Lys Thr Gln

1 2 / 3 3

1395

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Leu Leu Asn Arg Ser Met Glu Phe His Ala Glu Lys Glu Glu Ile Val

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Arg Gly Asp Val Lys Gln Ala Ile Gln Lys Leu Phe Ser Glu Glu Arg

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Cys Ala Lys Arg Gly Ile Leu Ile Gln Glu Asp Glu Lys Gly Asp Val

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1450

1455

Asn Met Thr Ile Tyr Cys Leu Leu His Glu Asn Ala Gly Asp Lys Thr

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Lys Arg Glu Asp Ile Leu Gly Gly Asp Val Arg Arg Thr Ile His Asn

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Asp Ala Ser Glu Arg Gly Asn Val Gln Phe Phe Thr Thr Cys Ile Glu

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1 3 / 3 3

Thr Leu Thr Ala Arg Lys Gln Glu Gly Glu Glu Glu Ile Ile Gly Gly

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Asp Val Glu Gly Thr Lys Phe Leu Leu Lys Lys Arg Gln Ser Ser Ile

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Glu Arg Thr Val Ser Glu Thr Asp Ile Ile Pro Gly Asp Val Arg Asn

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Thr Val Lys Val Phe Met Thr Glu Pro Gln Ser Ala Ser Phe Lys Thr

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Ala Lys Glu Glu Ile Val Lys Gly Asp Leu Lys Ser Thr Leu Asn Ser

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1625

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Met Lys Asp Asp Lys Ala Ala Ile Leu Lys Ser Leu Lys Glu Ser Gly

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Gly Arg Gln Lys Glu His Lys Gln Ser Ala Ser Ile Ser Ser Asp Ile

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1660

Gly Gln Ala Ile Glu Cys Leu Glu Lys Ala Thr Asn Thr Arg Thr Glu

1665

1670

1675

1680

1 4 / 3 3

Ile Leu Lys Lys Glu Leu Ile Leu Asp Asp Leu Lys Thr Ser Leu Arg

1685

1690

1695

Ser Leu Lys Glu Glu Gln Tyr Ser Phe Lys Glu Val Gly Lys Gln Gly

1700

1705

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Met Val Lys Asp Val Leu Gly Phe Ser Glu Arg Gln Glu Leu Gly Ile

1715

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1725

His Pro Ala Ala Val Gln Arg Glu Lys Lys Ser Leu Leu Gln Pro Val

1730

1735

1740

Pro Gly Pro Cys Glu Pro Ala Ile Arg Gln Gln Ala Gly Pro Gly Pro

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Arg Thr Glu Ala Asn Leu Pro Lys Ala Pro Lys Gly Thr Val Lys Ile

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1790

Val Ile Asp Arg Glu Gln Asn Asn Asp Ala Leu Glu Lys Ser Leu Arg

1795

1800

1805

Lys Met Ser Asn Ser Glu His Arg Ala Met Lys Asn Val Leu Asp Met

1 5 / 3 3

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Gly Asp Arg Arg Gly Val Trp Thr Glu Ser Lys Glu Cys Leu Cys Ser

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1840

Asp Asp His Met Ser Lys Tyr Val Ser Ala Ser Met Ser Arg Lys Lys

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Ser Leu Lys Thr Lys Glu Ser Glu Asn Val Arg Glu Ser Lys Asp Asp

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Val Ser Ser Thr Gln Ser Val Asp Lys Thr Phe Arg Lys Gln Gln Thr

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1885

Gln Asn Cys Glu Leu Gly Lys Asp His Gln Lys Ser Gln Phe Gln Asp

1890

1895

1900

Ser Tyr Ala Lys Asn Gln Lys Asn Thr Gln Asn Ile Ser Met Ser Ala

1905

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1920

Glu Thr Gln Ser Tyr Arg Pro Asp Pro Thr Gln His Pro Val Ser Asn

1925

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1935

Pro Ala Gly Glu Thr Leu Glu Met Thr Arg Asp Phe Gln Lys Gln Ala

1940

1945

1950

1 6 / 3 3

Leu Ile Arg Gln Glu Lys Gln Asn Ser Asn Lys Asp Met Arg Lys Asn

1955

1960

1965

Asp Met Gly Leu Gln Pro Leu Pro Val Gly Lys Asp Ala His Ser Ala

1970

1975

1980

Pro Gly Val Thr Val Ser Gly Lys Asn His Lys Arg Thr Gln Ala Pro

1985

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1995

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Asp Lys Lys Gln Arg Ile Asp Val Cys Leu Glu Ser Gln Asp Phe Leu

2005

2010

2015

Met Lys Thr Asn Thr Ser Lys Glu Leu Lys Met Ala Met Glu Arg Ser

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2025

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Phe Asn Pro Val Asn Leu Tyr Pro Asp Cys Gly Val Lys Glu Asn Glu

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Asp Ala Leu Pro Pro Pro Ser Pro Pro Pro Pro Pro Pro Ser Asn Ala

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Ser Ser Glu Ile Glu Phe Pro Leu Pro Pro Pro Pro Pro Ile Met Leu

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Leu Pro Glu Lys Asn Glu Phe Pro Pro Ser Ser Pro Thr Glu Lys Ser

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Arg Ala Glu Leu Glu Ser Leu Pro Thr Leu Pro Leu Pro Pro Pro Pro

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Gly Asp Glu Lys Ser Asp Gln Glu Cys Leu Pro Thr Ser Leu Pro Pro

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Pro Pro Pro Thr Ala Pro Ser Gln Pro Ala His Leu Leu Ser Ser Ser

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2140

Val Leu Glu His His Ser Glu Ala Phe Leu Gln Gln Tyr Ser Arg Lys

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2160

Glu Thr Leu Asp Ser His Gln Leu His Ser Gln Ala Lys Ile Leu Thr

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Gly Lys Ser Pro Pro Pro Thr Leu Pro Lys Pro Lys Leu Pro Glu Arg

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Ile Lys Ala Lys Met Ser Gln Asp Ser Pro Ser Gly Glu Leu Glu Arg

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2200

2205

Ser Leu Ser Asp Val Glu Ile Lys Thr Thr Leu Ser Lys Asp Gln Lys

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Ser Ser Leu Val Ala Glu Ser Arg Glu His Thr Glu Ala Lys Gln Glu

1 8 / 3 3

2225 2230 2235 2240

Val Phe Arg Lys Ser Leu Gly Arg Lys Gln Leu Ser Ile Ser Ser Ala

2245 2250 2255

Asn Ser Leu Ser Gln Thr Val Pro Glu Ile Pro Ala Pro Lys Glu Lys

2260 2265 2270

Gln Thr Ala Pro Leu Val Lys Ser His Ser Phe Pro Ser Gly Ser Glu

2275 2280 2285

Gln Gln Ser Pro Lys Pro Tyr Met Arg Lys Phe Lys Thr Pro Leu Met

2290 2295 2300

Ile Ala Glu Glu Lys Tyr Arg Gln Gln Arg Glu Glu Leu Glu Lys Gln

2305 2310 2315 2320

Arg Arg Glu Ser Ser Cys His Ser Ile Ile Lys Thr Glu Thr Gln His

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Arg Ser Leu Ser Glu Lys Glu Lys Glu Thr Glu Leu Gln Lys Ala Ala

2340 2345 2350

Glu Ala Met Ser Thr Pro Arg Lys Asp Ser Asp Phe Thr Arg Ala Gln

2355 2360 2365

19 / 33

Pro Asn Leu Glu Pro Lys Ser Lys Ala Val Ile Ala Ser Glu Cys Ser

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Glu Ser Gln Leu Ser Thr Ala Ser Ala Leu Thr Val Ala Thr Glu Arg

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Glu Gly Thr Gln Asn Ser Ser Asp Thr Leu Gln Ser Lys Thr Ala Cys

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Glu Ile Asn Gln Ser His Lys Glu Cys Arg Thr Glu Gln Thr Phe Glu

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Gln His Val Glu Lys Leu Pro Phe Pro Gln Thr Lys Pro Ile Ser Pro

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Ser Phe Lys Val Lys Thr Ile Arg Leu Pro Ala Leu Asp His Thr Leu

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Thr Glu Thr Asp Leu Ser Ser Glu Arg Arg Val Lys Gln Ser Glu Ile

2485

2490

2495

Asp Val Gln Thr Ser Thr Lys Glu Met Asn Lys Glu Ile Lys Lys Thr

2500

2505

2510

20 / 33

Glu Val Ser Thr Gln Cys Asp Asn Lys Gln Ser Val Ala Glu Lys Tyr

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Phe Gln Leu Pro Lys Thr Glu Lys Arg Val Thr Val Gln Met Pro Lys

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Asp Tyr Ala Ala Lys Ser His Gln Ser Lys Leu Gln Thr Val Pro Lys

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2550

2555

2560

Lys His Gly Gly Leu Gly Glu Phe Asp Arg Gly Asn Val Leu Gly Arg

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2575

Glu Gly Lys Asn Gln Asp Ser Ser Met Ser Ser Thr Lys Glu Ser Arg

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Val Ile Val Glu Arg Lys Gln Glu His Leu Gln Asp Gln Ser Val Pro

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2600

2605

Arg Leu Val Gln Gln Lys Ile Ile Gly Glu Ser Leu Asp Ser Arg Val

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Gln Asn Phe Gln Gln Thr Gln Thr Gln Thr Ser Arg Ile Glu His Lys

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2635

2640

Glu Leu Ser Gln Pro Tyr Ser Glu Lys Lys Cys Leu Arg Asp Lys Asp

2 1 / 3 3

2645

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Lys Gln Gln Lys Gln Val Ser Ser Asn Thr Asp Asp Ser Lys Gln Glu

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Ile Thr Gln Lys Gln Ser Ser Phe Ser Ser Val Arg Glu Ser Gln Gln

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Asp Gly Glu Lys Cys Ala Ile Asn Ile Leu Glu Phe Leu Arg Lys Arg

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Pro Val Trp Leu Ile Ser Glu Glu Lys Arg Glu Tyr Gly Val Arg Val

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Ala Met Glu Asn Asn Leu Glu Lys Val Lys Glu Glu Ile Ile His Ile

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Lys Thr Gln Ala Glu Glu Met Leu Val His Cys Glu His Val Ile Arg

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Thr Ala Met Met Ala Ser Gln Thr Gly Lys Gln Lys Asp Lys Pro Thr
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Ala Lys Thr Tyr Gln Glu Ala Lys Gly Asp Asp Ser Lys Met Ala Pro
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Pro Ser Leu Lys Thr Arg Pro Pro Ser Pro Thr Phe Ile Thr Ile Glu
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Ser Thr Ala Arg Arg Ala Glu Thr Ser Thr Lys Ser Glu Leu Ser Gln
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23 / 33

Arg Ser Arg Ser Glu Gln Leu Val Arg Leu Lys Asp Thr Thr Ala Arg

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Leu Ala Lys Gly Thr Ile Pro Cys Ser Pro Gly Thr Pro Val Pro Val

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Val Glu Lys Arg Ser Glu Val Val Met Ser Pro Ala Thr Leu Arg Arg

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Gln Ile Lys Ile Glu Ser Arg Gly Gly Asp Ser Pro Pro Thr Ile Thr

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Ile Pro Val Ser Val Asn His His Val Val Ser Gly Ser Phe Arg Glu

2995

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3005

Ser Val Asp Ala Gln Glu Ala Val Lys Lys Thr Glu Lys Thr Glu Thr

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3015

3020

Tyr Val His Lys Asp Lys Lys Asn Ser Val Ser Ser Ala Met Pro Glu

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3040

Thr Glu Ser Tyr Asp Ala Val Glu Ile Ile Arg Lys Val Glu Gly Pro

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3050

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His Leu Ser Glu His Arg Glu Arg Phe Glu Ala Thr Asn Gln Thr Val

2 4 / 3 3

3060

3065

3070

Gln Met Ala Glu His Phe Leu Asn Gly His Glu Asn Glu Val Asn Arg

3075

3080

3085

Trp Phe Arg Glu Phe Glu Asn Gly Pro Val Phe Gly Ala Lys Thr Glu

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3100

Arg Arg Ala Tyr Ala Asn Gly Glu Ile Asn His Asn Met Lys Gln Glu

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3110

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3120

Ser His Thr Phe Cys Lys Glu Glu Phe Gly Leu Glu Ser Ser Glu Thr

3125

3130

3135

Ala Asn Phe Thr Gly Phe Ser Tyr Arg His Pro Arg Glu His Arg Ala

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3145

3150

Lys Ala Pro Ala Thr Gln Pro Arg Val His Ser Glu Ala Arg Ala Leu

3155

3160

3165

Asn Glu His Phe Leu Ser Val Asp Ala Phe Asp Ser Gln Ile Val Glu

3170

3175

3180

Ser Gln Val Ala Thr Ser Ser Ser Arg Ser Ser Glu Ala Gly Arg Ser

3185

3190

3195

3200

2 5 / 3 3

Gly Phe Asp Phe Lys His Ala Pro Pro Thr Tyr Glu Asp Val Ile Ala

3205

3210

3215

Gly His Ile Leu Asp Ile Ala Asp Ser Pro Thr Asn Leu Arg Arg Asn

3220

3225

3230

Phe Gln Lys Thr Trp Gln Glu Ser Glu Arg Val Phe Lys Ser Val Gly

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3240

3245

Tyr Glu Thr Ser Asp Ala His Ala Thr Glu Met Ser Arg Ala Phe Gln

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Glu Glu Leu Ala Phe Leu Ser Glu Thr Val Gly Pro Arg Gln Gly Asn

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